

Examining the Dietary Status and its Implications on Perceived Health Status and Food  
Security of Food Pantry Clients

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## **Abstract**

The United States Department of Agriculture (USDA) defines food security as having “access by all people at all times to enough food for an active, healthy life.”<sup>20</sup> In 2012, it was estimated that 17.3% of people in Franklin County, Ohio were food insecure.<sup>8</sup> People who are food insecure may experience diet-related health issues, including Type 2 diabetes and high blood pressure. Many also rely on food pantries to meet monthly food needs. While some research has indicated a connection between food insecurity and poor health, more information based on direct communication with food pantry clients can reveal more about dietary intake and the multifaceted challenges clients face related to food purchasing and consumption. This study examines the nutrition, health, and food security status of food pantry clients at Neighborhood Services, Inc. (NSI). A survey, administered to 78 clients, collected data on clients’ household food security status, dietary consumption, food environment, fruit and vegetable consumption, and health conditions. A follow-up dietary recall was administered to 30 clients, and an in-depth interview with the NSI director was also conducted. Preliminary results indicate that clients who were food insecure identified barriers (48% for cost and 19% for transportation) that limited their quality of diet. In addition, 54.2% of the population exhibited very low food security and 81.2% of clients were overweight or obese, as compared to national averages of 5.6% and 65.8%, respectively. This study explores the relationships amongst dietary intake, fruit and vegetable consumption, food security, and health outcomes. Understanding these results will provide opportunities to test interventions with clients or the food pantry itself to improve the nutritional quality of foods received and the clients’ health.

## **Background**

In 2012, 49.0 million Americans (14.0%) lived in food insecure households, which included 33.1 million adults and 15.9 million children.<sup>7</sup> The United States Department of Agriculture (USDA) describes food insecurity as being “uncertain of having, or unable to acquire, enough food”<sup>20</sup>. In Columbus, Ohio it is estimated that 17.3% of people in Franklin County, Ohio are food insecure, which includes over 59,000 children.<sup>8</sup> Food security is categorized into four different levels: high, marginal, low, and very low food secure. Those who are identified as high food secure have “no reported indications of food-access problems”.<sup>20</sup> Marginal food security is when there are one or two reported indications. Low and very low food security are the two categories that USDA defines as most concerning. Low and very low food secure people may have disrupted eating patterns, reduce their dietary intake, skip meals, run out of food before the end of the month, rely on government food assistance, and use emergency food pantries. Furthermore, food insecurity can impact health outcomes and increase the risk for developing chronic disease.<sup>17</sup>

According to the Hunger in America 2010 study for Central and Eastern Ohio conducted by Mid-Ohio Foodbank, it is estimated that 41% of clients must choose between paying for food or paying for medicine or medical care.<sup>11</sup> According to one study, the risk of clinical diabetes was approximately 50% higher among adults living in food insecure households compared with adults living in food-secure households.<sup>18</sup> Managing type 2 diabetes is difficult for many people in food insecure households because of lack of physical and economic access to foods, such as fruits and vegetables, consistent with a diabetes-appropriate diet. Overweight is also a related consequence of food insecurity that can lead to diabetes. Another study revealed that the prevalence of overweight increased from 34% among food secure women to 52% for women

who were moderately food insecure.<sup>19</sup> Consumption of cheaper, readily available food alternatives, such as canned goods and processed foods, are energy dense and nutritionally poor, which can lead to chronic disease and obesity.

Although participants in the two previous studies about food security and diabetes and overweight status did not necessarily obtain food from food pantries, their food security status was related to health conditions. Dietary intake is also affected by food insecurity. For those with a low socioeconomic status (SES), the cost of food limits consumption and affordable healthy food access.<sup>23</sup> High-fat and sugar processed foods, or high-energy density foods, are available more readily and at a lower cost compared to fresh produce, quality meats, and dairy in many low-income communities. These communities also typically lack a grocery store in the surrounding area and are known as food deserts.<sup>22</sup> Not only does cost of food become a factor, but physical access to nutritious foods impacts households. In order to most efficiently use money, families often have to make difficult purchasing decisions and may choose less nutritious foods, which affects overall energy intake and can lead to obesity.<sup>5</sup> Food security also leads to disrupted eating patterns of underconsumption (i.e., skipping meals) when food is scarce and overconsumption when adequate resources become available.<sup>23</sup> Dietary intake is especially important to understand in the context of individuals who rely on food pantries because food options vary across locations and may be limited. Providing healthy foods can increase access to nutritious foods and may be one method for impacting dietary habits; this could mitigate obesity and overweight and help control type 2 diabetes for food pantry clientele.

Throughout the United States, approximately five million people rely on food pantries, especially to supplement monthly food shortages.<sup>9</sup> Among food pantries associated with Feeding America, the leading domestic hunger-relief charity, 74% of pantries, 65% of soup kitchens, and

54% of shelters reported an increase in the number of clients utilizing program sites since 2006.<sup>7</sup> According to the Hunger in America 2010 study conducted by Feeding America, food banks have become a staple for individuals to provide the majority of food for themselves or households.<sup>6</sup> Resources are now also more limited at pantries because of an increase in clientele due to economic hardship. Because of this new trend in reliance on emergency food programs, it is necessary that these programs impact the health of clients positively and strive to alleviate food insecurity.

In Columbus, Ohio, Neighborhood Services, Inc. (NSI) is an organization that provides food services and material assistance to individuals in the Weinland Park neighborhood and the surrounding Ohio State community, regardless of income or employment status. In the Weinland Park community nearly half of the population is below the federal poverty line, nearly 25% are unemployed, and 64% of adults have a high school degree<sup>1</sup>. NSI serves the zip codes 43201, 43210, 43211, and 43202. Clients must provide a proof of address to be eligible to be served monthly. Their mission is to, “offer innovative, regional leadership in the effort to alleviate poverty and provide food services, and material assistance to persons in need in the Columbus community”.<sup>13</sup> In 2012, NSI served 4,044 Columbus families food to offset shortages in their community.

NSI hosts a choice food pantry program, which registered clients can use on a monthly basis. In a choice food pantry program, volunteers assist clients as they choose which items to include in their food box.<sup>15</sup> Options at NSI consistently include pasta, canned vegetables, canned fruits, peanut butter, bread, canned soup, canned tomato sauce, varied frozen meats, cereal, and sweets. For these items, clients are restricted to a certain number of items based on their household size. For instance, individuals can receive two boxes of cereal for a household size of

1-4 people. Produce, mainly supplied by the Mid-Ohio Foodbank, varies each week. Clients at NSI have unlimited monthly access to fresh produce.

A choice food pantry program is unique in its nature because it empowers clients to make decisions about foods and provides the pantry opportunity to educate its neighbors about nutrition. By first understanding the health status of the clients, appropriate interventions may be planned to provide the best access to healthy food.

### **Methods**

The aim of this study was to explore the relationships amongst clients' dietary status, perceived health, and food security at a choice food pantry. This research used a cross-sectional approach, using a variety of methods. In-person surveys were administered onsite at Neighborhood Services, Inc. A 5-10 minute telephone follow-up interview about dietary recall (listing food items consumed by the participant) was administered seven days after completion of the initial survey. The self-efficacy of NSI to provide for clients was examined through semi-structured interview with the NSI director.

### **Sampling Frame**

Clients, who are 18 or over, were selected to participate in the survey as they waited in line to receive food items at NSI. 78 clients were interviewed and 30 clients participated in the dietary recall follow-up. Data were collected from June-August 2014 and in November 2014. A \$10 Kroger gift card was provided to clients for completing the initial survey and a \$5 Kroger gift card was mailed to clients if they participated in the follow-up dietary recall phone call. This study was approved by the Institutional Review Board (IRB) at Ohio State University.

### **Survey Instrument**

Clients were asked questions via a 10-20 minute survey instrument that consisted of 8

modules: 1) Demographics 2) Food Security Status 3) Food Preparation 4) Dietary Recall 5) Fruit and Vegetable Consumption 6) Health Conditions 7) Neighborhood Services, Inc. 8) Food Sources. The survey administered at NSI was developed through a comprehensive review of national surveys, previous surveys conducted in Central Ohio and at the University of Missouri, and community food assessment surveys. A copy of the initial survey is included in Appendix A.

Demographic questions included, but were not limited to, information about race, gender, income level, and types of food assistance program clients used. Food security was measured using the USDA 6-item short form food security module. Researchers from Abt Associates, Inc. and the National Center for Health Statistics created the scale based on the 18-item U.S. Household Food Security Survey Module.<sup>4</sup> This is now considered a surrogate to the longer module when there is a time constraint for the researcher and to not burden participants. Because the module is part of a longer survey, the short form was deemed appropriate.

Information about food preparation in the household was collected to understand how food obtained at the pantry is used by clients. This information can provide information about nutrition status, but also provides useful information to NSI in order to provide for clients more effectively or implement community programs.

Dietary recall consisted of a 24-hour recall by the respondent followed by a 5-10 minute telephone survey 7 days after completion of the initial survey. Initial dietary recall asked participants to list the previous day's intake, including brand names of food items and approximate measurements of foods consumed. Dietary recall was also used to measure nutrition status of clients. This methodology was adapted from the Automated Multiple-Pass Method (AMPM) created by the USDA.<sup>12</sup>

Fruit and vegetable consumption was analyzed with self-reports of number of servings



each day. This information provided measurement for nutrition status for NSI clients along with dietary recall. Clients were provided with examples of what one serving of a fruit and vegetable was to aid in self-reporting the information.

Health conditions related to diet (diabetes, high cholesterol, and hypertension) were reported to gather information about health status of NSI clients. Height and weight was also reported to calculate Body Mass Index (BMI) to categorize weight as underweight, normal, overweight, or obese.<sup>2</sup> BMI is calculated from weight (kg)/ [height (m)]<sup>2</sup>.

Participants were asked about how often they visit Neighborhood Services, Inc. and what food items are most important for them to receive during the monthly visit<sup>10</sup>. These tools were determined through conversations with the NSI director. These data can provide direct information to the NSI staff to gain a better context of the needs of clients they serve.

Food source items have been used by the investigators in a current study mapping the food environment of Central Ohio.<sup>16,21</sup> Understanding if clients use other emergency programs can provide NSI workers insight on the needs of the population it serves.

### **Follow-Up Dietary Recall Survey**

Since dietary recall from the survey was recorded as clients visited the pantry, the follow-up's aim was to assess if food provided by the pantries impacted client dietary intake. The follow-up survey about dietary recall included a second dietary recall, questions about consumption from each food group, defined by the USDA, questions about which food items from NSI have been used by households, and questions about foods purchased or obtained at other food sources. Information was used to measure dietary status. The follow-up dietary recall survey is found in Appendix B.

## **Director Interview**

Another aspect of the research included analyzing the self-efficacy of NSI to provide adequate, nutritious food for clients. This was determined through a semi-structured interview with the NSI director. This survey is found in Appendix C.

## **Data Analysis**

All data were analyzed utilizing SPSS software. Results were analyzed via Chi-Square and independent t-test sampling. Chi-Square analysis was utilized due to the categorical nature of some of the data. For example, food security is categorized as high/marginal, low, and very low. Independent t-test sampling was also utilized for continuous data, such as fruit and vegetable consumption. Frequency distributions, mean, standard deviation, and standard errors were used.

## **Results**

### **Descriptive Results**

The sample included, in total, 74 adult clients. Four initial surveys were excluded from the analysis after data cleaning for outliers. Selected sample characteristics are included in Table 1. Survey participants were mostly female (74.3%), with only about one-fourth identifying as male. The mean age was 42 ( $SD=12$ ). Over half of clients (58.1%) were not currently employed while 13.5% were full-time employed. In terms of income, over half of clients (58.9%) had a household income of less than \$10,000. Over 80% of clients received Supplemental Nutrition Assistance Program (SNAP) benefits. Over half of clients had either a high school diploma/GED or less, while over 12% of clients had a bachelor's or Master's degree. Nearly 80% of clients were overweight or obese (according to BMI standards) and over 50% of clients were very low food secure.

**Table 1.**

***Selected Sample Characteristics***

<b>Selected Sample Characteristics (N=74)</b>	
Gender	26% male 74% female
Age	mean = 42.8 years, SD = 12.0
Employment Status	13.5% full-time employed 17.6% part-time employed 58.1% not currently employed 8.3% other
Household income	58.9% less than \$10,000 17.8% \$10,000-\$19,999 19.2% \$20,000-\$29,999 4.1% \$30,000+
Education level	56.8% less than high school diploma, high school diploma, or high school GED 31.1% some college or 2-year degree 12.2% bachelor's degree or Master's degree
Food security status	55.4% very low food security 24.3% low food security 20.3% high food security
Body Mass Index (BMI)	20.3% underweight or normal 79.7% overweight or obese
SNAP recipient	82.4% received SNAP benefits

**Fruit and Vegetable Consumption and SNAP Benefits**

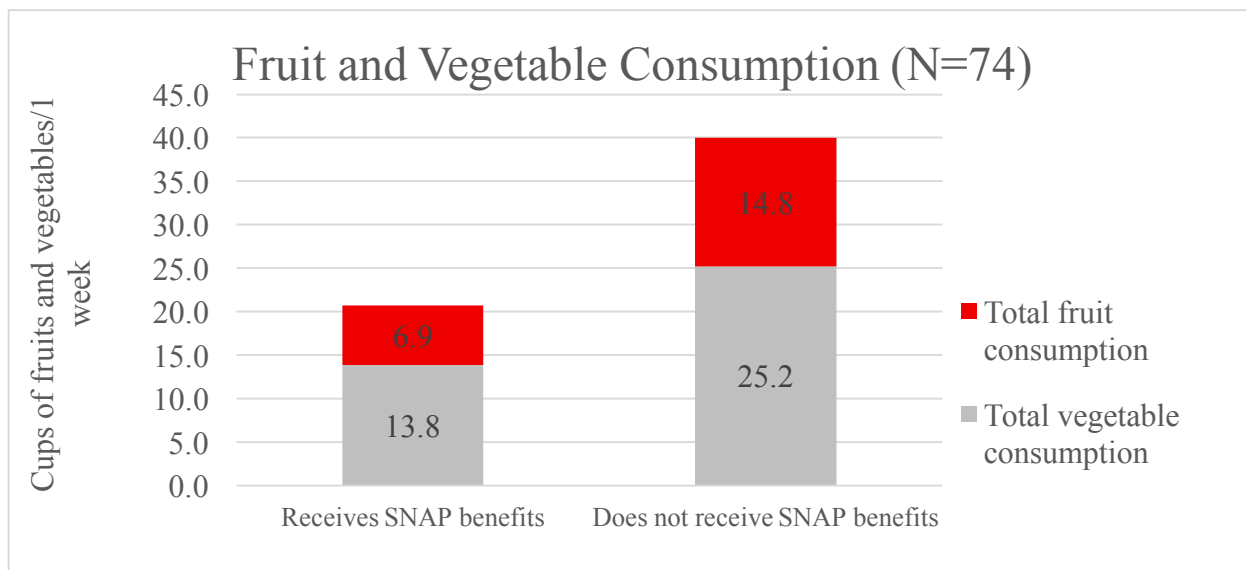
Since over 80% of clients receive SNAP benefits, fruit and vegetable consumption among this group was explored (See Figure 1). On average, those without SNAP benefits consumed more vegetables ( $M=25.23$ ,  $SE=3.72$ ) than those with SNAP benefits ( $M=13.82$ ,  $SE=1.4$ ). Independent sample t-tests were used and the difference was significant ( $p=.002$ ). This represented a medium effect size of  $r=.35$ .

In terms of fruit consumption, those without SNAP benefits consumed more cups fruit per week ( $M=14.77$ ,  $SE=2.17$ ) than those with SNAP benefits ( $6.91$ ,  $SE=0.91$ ) Independent sample t-tests were used and the difference was significant ( $p=.004$ ). This represented a medium effect size of  $r=.39$ .

Although not statistically significant, for those with SNAP benefits, 52.5% stated that cost was a barrier and 37.7% reported transportation was a barrier. In addition, those identifying as food insecure consumed more cups of canned vegetables ( $M=4.25$ ,  $SD=4.06$ ) and canned fruit per week ( $M=2.25$ ,  $SD=3.32$ ) than those who were food secure ( $M=3.2$ ,  $SD=2.94$ ) and ( $M=1.8$ ,  $SD=3.56$ ).

**Figure 1**

***Fruit and Vegetable Consumption Among SNAP/non-SNAP recipients using a food pantry***



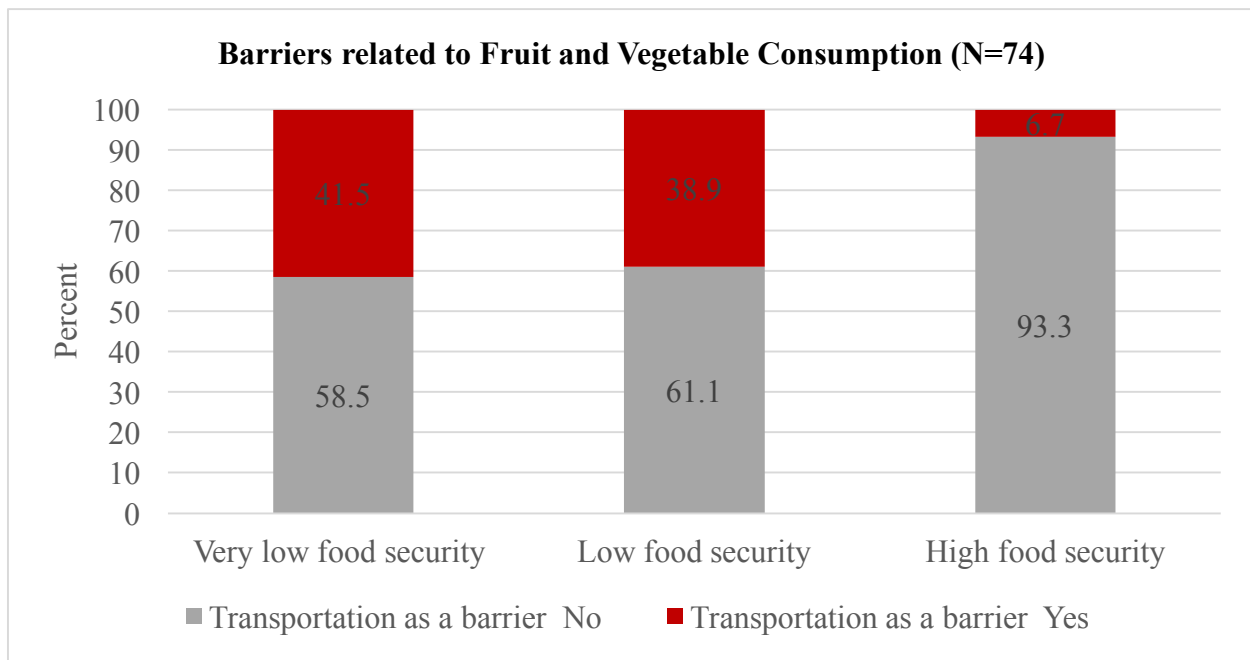
### **Barriers and Fruit and Vegetable Consumption**

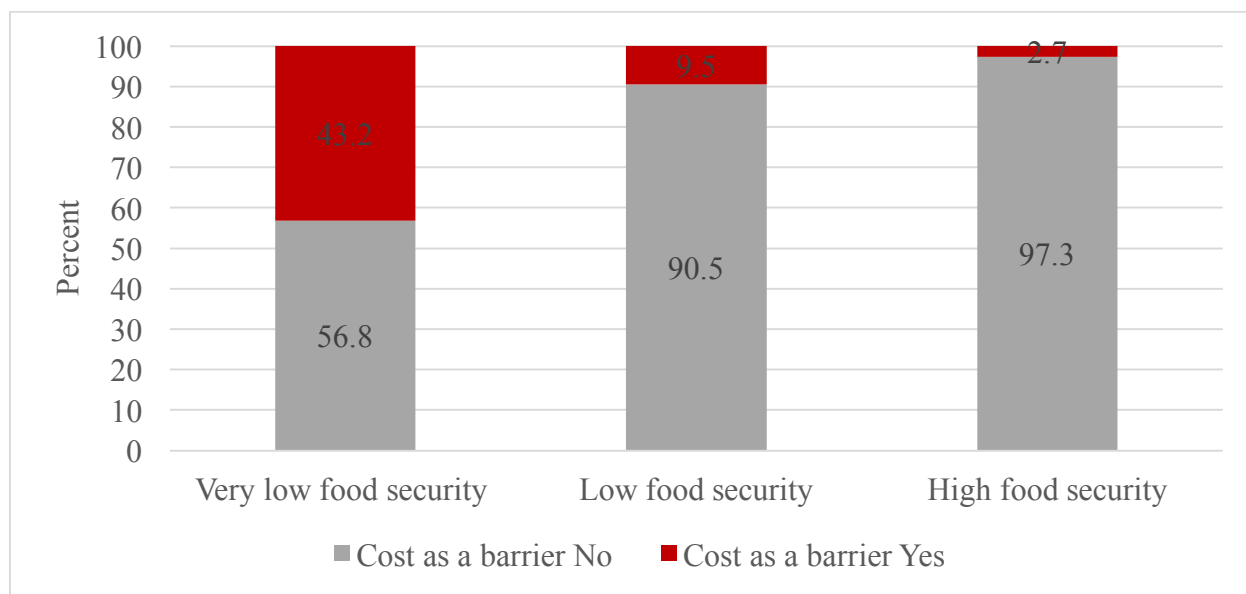
There were barriers impeding quality intake, especially among the very low food secure group versus the high food secure group concerning fruit and vegetable consumption (See Figure

2). Clients were asked to self-report which were barriers to consuming fruits and vegetables based on a list of items provided on the survey (see Appendix A). On average, clients who were very low food secure identified transportation as a significant barrier to consuming fruits and vegetables as opposed to clients who reported high food security ( $\chi^2=6.221$ ,  $p = .045$ ). Clients who were very low food secure also reported cost as a significant barrier to consuming fruits and vegetables compared to clients who were high food secure ( $\chi^2=21.241$ ,  $p = .00$ ).

**Figure 2**

*Self-Identified Barriers Reported to Fruit and Vegetable Consumption from Clients Using a Food Pantry*





## Dietary Intake

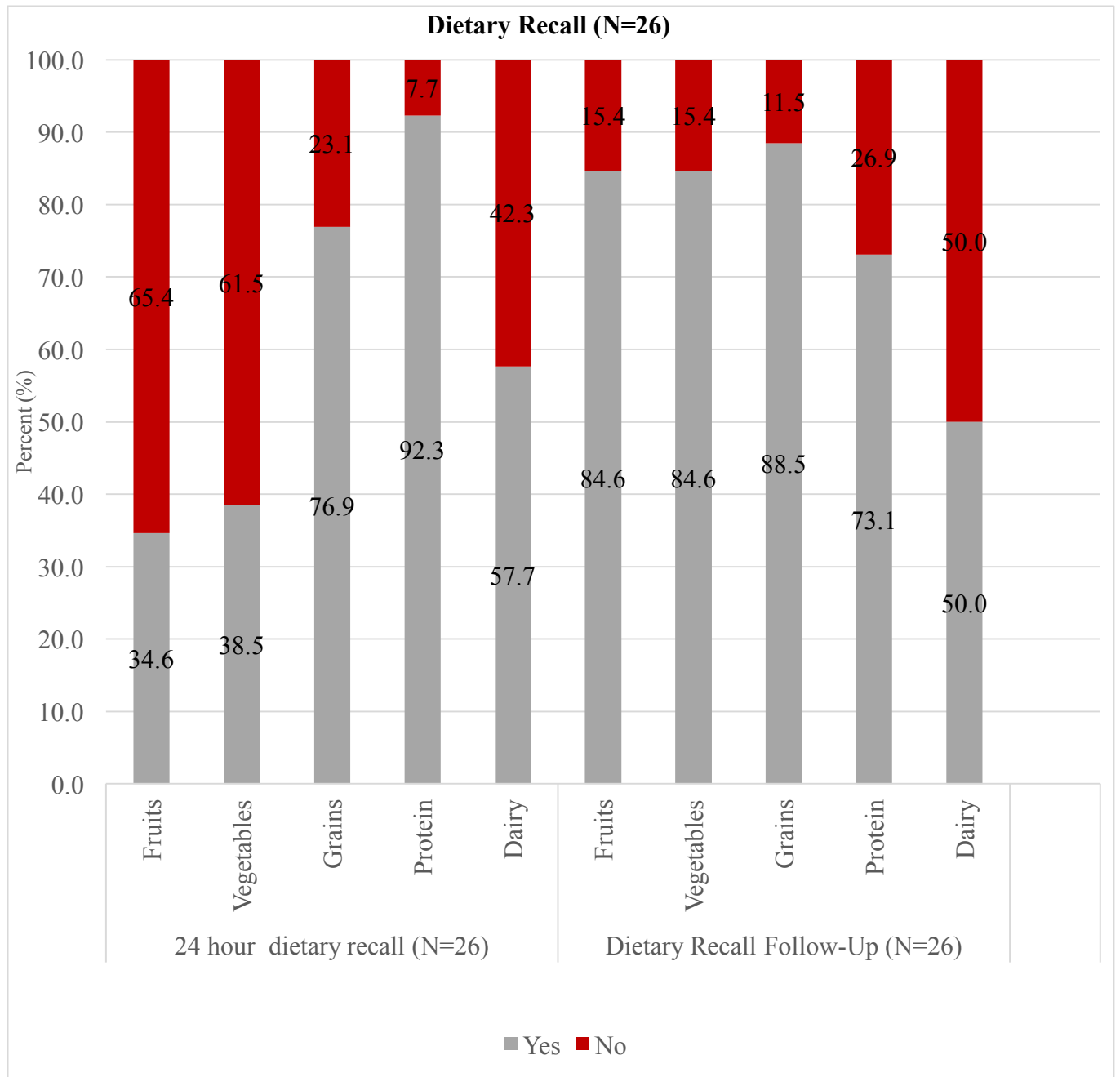
To further explore dietary intake, general consumption was compared to a subset who completed a phone follow-up one week after initially visiting the pantry. Of the 78 clients surveyed, 30 participated in the follow-up, of which 26 completely finished the follow-up survey. The initial survey included a 24-hour dietary recall, in which clients listed foods consumed the day before arriving at the pantry. The follow-up specifically asked which food groups/items were consumed from the food pantry one week later. Figure 3 compares the frequency of food groups consumed before and after visiting the food pantry.

26 clients completed a dietary recall follow-up 1 week after visiting the food pantry. Above is a comparison of general food groups consumed by clients before visiting the food pantry and 1 week after visiting. Clients consumed more food in each food group consistently 1 week after visiting the food pantry, except for the protein category (73.1% 1 week later versus 92.3% during the 24-hours dietary recall). In the protein category, clients were informed that items could include meat, but also vegetarian protein options, such as canned beans, or other meat items, such as canned beef stew.

**Figure 3**

**Percent of Clients Reporting Intake of Pantry Foods Before and 1 week after Food Pantry Visit**

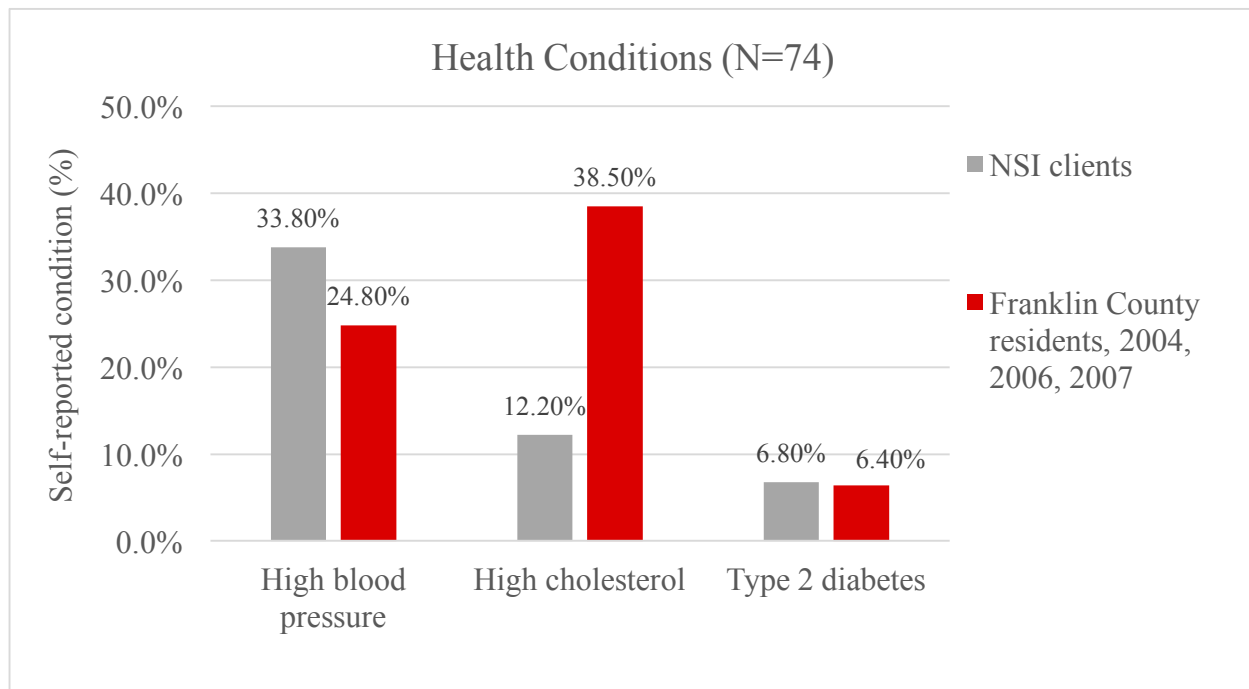
**Visit**



In relation to dietary intake, health conditions among clients were explored and compared to Franklin County averages (see Figure 4). Based on self-reporting of chronic conditions, 33.80% reported that they had been informed they have high blood pressure, as compared to the Franklin County average of 24.80%. Regarding high cholesterol, 12.20% of clients had high cholesterol, compared to Franklin County average of 38.50%. Self-reporting of type 2 diabetes between NSI clients and Franklin County residents was similar (6.80% and 6.40%)<sup>14</sup>.

**Figure 4**

***Self-Perceived Health Conditions of Clients***



**Food Sources**

Food sources were also explored among clients at NSI. Clients (N=74) were asked about other resources utilized to access food among their households. Over 90% of clients used food pantries, while approximately 4% scavenged for food. Over 60% of households had at least 1 family member enrolled in the federal school lunch/breakfast program.



**Table 2**

**Food Sources (N=74)**

Food Sources	
Food pantry	93.20%
Free meal program	37.90%
Federal school lunch/breakfast program	64.20%
Farmer's market/produce stand	45.90%
Friends, co-workers, neighbors	39.20%
Extended family	41.90%
Community/personal garden	32.50%
Scavenging	4.10%

**Discussion**

Very low food security among clients at NSI is much greater than the national average (55.4% versus 5.6%).<sup>6</sup> In a similar trend, nearly 80% of clients were overweight and obesity, higher than the national average of 69%.<sup>3</sup> Both these trends are appropriate provided that this population utilized the pantry typically because of food shortage. Provided there is less food available, healthy food choices may also be limited, which could contribute the overweight/obesity trend.

Significant differences in terms of fruit and vegetable consumption persist among clients who receive Supplemental Nutrition Assistance Program (SNAP) benefits as opposed to those who do not receive these benefits. Over 80% of clients utilized SNAP, but those who did receive SNAP consumed significantly fewer fruits and vegetables as compared to those who do not receive SNAP. This can be explained possibly because of the “food stamp cycle.” Those on

SNAP benefits will have a 3-week period of overeating when SNAP and money is available followed by a 1-week period of food restriction when resources diminish.<sup>22</sup> This may contribute to diminished fruit and vegetable intake and further metabolic complications. Individuals who were food insecure also consumed more canned fruits and vegetables as compared to those who were food secure. Although consumption may be adequate, this indicates that quality of diet may be affected. Canned fruits and vegetables contain high sodium and sugar, which could affect the management of chronic diseases.<sup>17</sup>

To determine diet quality, general food groups were categorized before clients visited the food pantry and after clients received food. The follow-up was conducted via a phone call one week after the initial visit. In the follow-up dietary recall, clients consumed more fruits, vegetables, grains, and dairy than in the 24-hour dietary recall before visiting the food pantry. Foods in the protein category were consumed more before visiting the pantry than after (93.2% v. 73.1%, respectively). This may be because meats are expensive food items that may not be consumed immediately by families. When asked which food items at the pantry were important/very important to clients, nearly 95% indicated meat. Meat is an important household item among families at NSI, however because of its price at grocery stores and perhaps quality at the food pantry, it may not be consumed regularly. It should be noted that although it is unknown if pantry causes an increase in diet quality, clients do consume fresh produce taken from the food pantry.

Upon comparing diet quality, barriers to fruit and vegetable intake were also explored. From these data, it was determined that knowledge is not a significant barrier to eating fruits and vegetables (as reported by clients). This is important because if knowledge is not a self-identified barrier, current nutrition education programs may need to be re-examined. Much of public health

nutrition is focused in education, however, if it is not a significant barrier in this community, other strategies may be necessary to address food security, nutrition, and health. This will be discussed further in the Implications section. Transportation and cost, though, were significant barriers to eating fruits and vegetables among clients who were very low food secure as compared to those who were high food secure ( $\chi^2=6.221$ ,  $p = .045$ ,  $\chi^2=21.241$ ,  $p = .00$ , respectively).

### **Limitations**

Limitations of this study include a small sample size. Furthermore, NSI has increased its client population greatly each year and thus the sample may not be as representative. Due to the exploratory nature of this study, the data were not able to be compared to clients who did not use the food pantry. However, when appropriate, data from this population was compared to national or county averages (i.e. health conditions as compared to Franklin County averages). A future aim could be to compare the impact of the pantry by surveying neighbors in the community who do not utilize the pantry as compared to those who do. Out of the 78 clients surveyed, 30 participated in the follow – up. If the follow-up group was larger, that would prove more substantial for comparing diet quality. Furthermore, all data collected were self-reported. When measuring BMI or the frequency of various health conditions, clients may not have visited a health professional recently and thus the information may not be as accurate as possible. Self-identified barriers may not be as accurate as well because individual definitions of barriers (i.e. knowledge) may vary from person to person. Based on the information collected, though, there a variety of implications.

### **Impacts on Policy and Practice**

Policy discussion should focus on addressing the cost and transportation limitations to

accessing high-quality nutritious produce for food pantry users and those on SNAP benefits. This should be focused on more as opposed to knowledge among this population, as it was determined it is not a barrier to fruit and vegetable consumption. In particular, the personal definition of knowledge for participant may not be consistent on an individual basis, which could contribute to inaccuracy in these data. Perhaps establishing a baseline knowledge level in the community could provide for more effective nutrition education programming.

Diet quality may also be able to be improved through food pantry use, especially with the availability of fresh produce. Future direction may also involve examining the impact of food pantry produce markets (now provided at NSI) on improving diet quality and health outcomes. Further exploration of health and nutrition outcomes could be explored among clients to elucidate that relationship. For instance, gathering more clinical measures of health and nutrition status could be compared to the self-reported data from client. In particular, also analyzing the dietary intake of clients by micronutrient intake utilizing nutritional software could be performed.

Ultimately, this research aimed to shed light on hunger in this community and explore relationships between various aspects related to diet, health, and food security with the overall aim to increase awareness and provide evidence to promote future health and nutrition outreach initiatives.

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## References

1. Acey, C., et. al (2010). Weinland Park: Designing for People and Place. The Ohio State University Knowlton School of Architecture. Retrieved from: <http://faceweb.knowlton.ohiostate.edu/USC%20pdf/weinland/weinland%20park%20report.pdf>.
2. The Centers for Disease Control and Prevention. "About BMI for Adults." Healthy Weight. Retrieved from: [http://www.cdc.gov/healthyweight/assessing/bmi/adult\\_bmi/index.html#Definition](http://www.cdc.gov/healthyweight/assessing/bmi/adult_bmi/index.html#Definition)
3. The Centers for Disease Control and Prevention. "Obesity and Overweight." National Center for Health Statistics. Retrieved from: <http://www.cdc.gov/nchs/fastats/obesity-overweight.htm>
4. Coleman-Jensen, A, and Nord, M. (2014). Food Security in the U.S.: Six-Item Short Form of the Food Security Survey Module. United States Department of Agriculture Economic Research Service.
5. Drewnowski, A. and Specter, S.E. (2004). Poverty and obesity: the role of energy density and energy costs. The American Journal of Clinical Nutrition, 79, 6-16.
6. Feeding America. (2009). Food Banks: Hunger's New Staple. Chicago.
7. Feeding America. (2014). Hunger & Poverty Statistics. Feeding America. Retrieved from: <http://feedingamerica.org/hunger-in-america>.
8. Feeding America. (2012). Map the Meal Gap 2012: Food Insecurity. Chicago: Gundersen.
9. Foulkes, M. (2010). Coping with Hunger, 2010: Food Pantry Clients and Households in the Service Region of the Food Bank for Central and Northeast Missouri. University of Missouri Institute of Public Policy Harry S. Truman School of Public Affairs. Retrieved from [http://foodsecurity.missouri.edu/wp-content/uploads/2012/09/Coping-with-Hunger\\_20101.pdf](http://foodsecurity.missouri.edu/wp-content/uploads/2012/09/Coping-with-Hunger_20101.pdf)
10. Jensen, J., Heflin, C., Hermsen, J., and Rikoon, J.S. (2011). Feeding the Hungry: Results from a Survey of Food Pantry Directors in Mid-Missouri. University of Missouri Institute of Public Policy Harry S. Truman School of Public Affairs. Report 12 2011. Retrieved from [http://ipp.missouri.edu/files/ipp/attachments/12-2011\\_feeding\\_the\\_hungry.pdf](http://ipp.missouri.edu/files/ipp/attachments/12-2011_feeding_the_hungry.pdf).
11. Mid-Ohio Foodbank. (2010). Hunger in America, 2010: Mid-Ohio Foodbank Local Summary and Findings. Columbus.
12. Moshfegh, A.J., et. al (2008). The U.S. Department of Agriculture Automated Multiple Pass Method Reduces Bias in the Collection of Energy Intakes. The American Journal of Clinical Nutrition, 88, 324-332.

13. Neighborhood Services, Inc. (2013). Mission and Value Statement. Neighborhood Services, Inc. Retrieved from: <https://www.neighborhoodservicesinc.org/Mission.html>.
14. The Ohio Department of Health. (2008). Healthy Ohio Community Profiles. Office of Healthy Ohio, Columbus, Ohio.
15. Remley D, Osso T, Kaiser, M. (2013). A Case Study of Promoting Nutrition and Long-Term Food Security Through Choice Pantry Development. *Journal of Hunger and Environmental Nutrition*, 8, 324-336.
16. Rogers, C., Hand, M.D., Hoy, C., & Stanich, N.A. (2015). Finding our compass: The process of building our community-university food mapping team. *Journal of Community Engagement and Scholarship*. (*in press*).
17. Seligman, H.K., Laraia, B.A., and Kushel, M.B. (2010). Food Insecurity is Associated with Chronic Disease among Low-Income NHANES Participants. *The Journal of Nutrition and Disease*, 140, 304-310.
18. Seligman, H.K., et. al (2007). Food Insecurity is Associated with Diabetes Mellitus: Results from the National Health Examination and Nutrition Examination Survey (NHANES) 1999-2002. *Journal of General Internal Medicine*, 22(7), 1018-1023.
19. Townsend, M.S., et. al (2001). Food Insecurity is Positively Related to Overweight in Women. *The Journal of Nutrition and Disease*, 131, 1738-1745.
20. United States Department of Agriculture Economic Research Service (2013). Definition of Food Security. United States Department of Agriculture: Economic Research Service. Retrieved from: <http://www.ers.usda.gov>.
21. Usher, K., & Spees, C.K. (2015). Community food security strategies: An exploratory study of their potential for food insecure households with children. *Journal of Applied Research on Children: Informing Policy for Children at Risk*, 6(2), Article 2. Available at <http://digitalcommons.library.tmc.edu/childrenatrisk/vol6/iss2/2/>
22. Walker, R.E., Keane, C.R., and Burke, J.G. (2010). Disparities and access to healthy food in the United States: A review of food deserts literature. *Health & Place*, 16(5), 876-884.
23. Wilde, P.E. and Peterman, J.N. (2006). Individual Weight Change is Associated with Household Food Security Status. *The Journal of Nutrition and Disease*, 136, 1395-1400.

## Appendix A

### Survey

Date: \_\_\_\_\_

Time: \_\_\_\_\_

#### Screening Questions:

1. Are you 18 years of age or older?
  - a. Yes
  - b. No
2. Are you a registered client with Neighborhood Services, Inc. (NSI)?
  - a. Yes
  - b. No
3. Do you speak and/or understand English?
  - a. Yes
  - b. No



Survey Number: \_\_\_\_\_  
Participant ID: \_\_\_\_\_

## **I. Demographic Questions**

1. Could you please tell me your age? **DG1**\_\_\_\_\_

2. What is your gender? **DG2**\_\_\_\_\_

1. ☐ Male
2. ☐ Female
3. ☐ Other
4. ☐ Refuse to answer (995)/do not know (996)/not applicable (997)

3. What is your race? **DG3**\_\_\_\_\_

1. ☐ White
2. ☐ Black or African-American
3. ☐ Asian
4. ☐ Hispanic
5. ☐ American Indian or Alaska Native
6. ☐ Native Hawaiian or Other Pacific Islander
7. ☐ Other: \_\_\_\_\_
8. ☐ Refuse to answer (995)/do not know (996)/not applicable (997)

4. *What is the highest degree or level of school you have completed? If currently enrolled, mark the previous grade or highest degree received.*

- DG4**\_\_\_\_\_
1. ☐ Less than high school
  2. ☐ High school graduate - high school diploma or the equivalent (for example: GED)
  3. ☐ Some college or 2-year degree
  4. ☐ Bachelor's degree (for example: BA, AB, BS)
  5. ☐ Graduate degree
  6. ☐ Refuse to answer (995)/do not know (996)/not applicable (997)

5. What is your household size (including yourself)? **DG5**\_\_\_\_\_

- ☐ 1
- ☐ 2
- ☐ 3
- ☐ 4
- ☐ 5
- ☐ 6+
- ☐ Refuse to answer (995)/do not know (996)/not applicable (997)

6. *Are you currently a...?* **DG6**\_\_\_\_\_

1. ☐ Seasonal worker

2. ☐ Full-time employed (more than 35 hours/week)
3. ☐ Part-time employed (less than 35 hours/week)
4. ☐ Self-employed
5. ☐ Not currently employed
6. ☐ Student
7. ☐ Unable to work
8. ☐ Refuse to answer (995)/do not know (996)/not applicable (997)

7. What is your household income?

DG7 \_\_\_\_\_

1. ☐ Less than \$10,000
2. ☐ \$10,000 to \$19,999
3. ☐ \$20,000 to \$29,999
4. ☐ \$30,000 to \$39,999
5. ☐ \$40,000 to \$49,999
6. ☐ \$50,000 to \$59,999
7. ☐ \$60,000 to \$69,999
8. ☐ \$70,000 to \$79,999
9. ☐ \$80,000 to \$89,999
10. ☐ \$90,000 to \$99,999
11. ☐ \$100,000 to \$149,999
12. ☐ \$150,000 or more
13. ☐ Refuse to answer (995)/do not know (996)/not applicable (997)

8. In the past month, including yourself, how many members of your household received benefits from the following sources?

DG8 \_\_\_\_\_

1. ☐ Supplemental Nutrition Assistance Program (SNAP)  
How much SNAP benefits (\$) did your household receive last month?  
\_\_\_\_\_
2. ☐ Women, Infants, and Children (WIC)
3. ☐ Emergency Food Assistance Program (TEFAP)
4. ☐ Commodity Distribution Program
5. ☐ Child & Adult Care Food Program (CACFP)
6. ☐ LifeCare Alliance (Meals-on-Wheels)
7. Other, please list: \_\_\_\_\_
8. ☐ Refuse to answer (995)/do not know (996)/not applicable (997)

## II. Food Security

“I’m going to read you several statements that people have made about their food situation. For these statements, please tell me whether the statement was *often* true, *sometimes* true, or *never* true for you or your household in the last 12 months.”

1. The first statement is, “The food that (I/we) bought just didn’t last, and (I/we) didn’t have money to get more.” Was that often, sometimes, or never true for (you/your household) in the last 12 months?

1. ☐ Often true **FS1** \_\_\_\_\_  
2. ☐ Sometimes true  
3. ☐ Never true  
4. ☐ DK or Refused

2. “(I/we) couldn’t afford to eat balanced meals.” Was that often, sometimes, or never true for (you/your household) in the last 12 months?

1. ☐ Often true **FS2** \_\_\_\_\_  
2. ☐ Sometimes true  
3. ☐ Never true  
4. ☐ Refuse to answer (995)/do not know (996)/not applicable (997)

3. In the last 12 months, since last (name of current month), did (you/you or other adults in your household) ever cut the size of your meals or skip meals because there wasn't enough money for food?

1. ☐ Yes **FS3** \_\_\_\_\_  
2. ☐ No (Skip AD1a)  
3. ☐ DK (Skip AD1a)

- a. [IF YES ABOVE, ASK] How often did this happen—almost every month, some months but not every month, or in only 1 or 2 months?

1. ☐ Almost every month **FS3a** \_\_\_\_\_  
2. ☐ Some months but not every month  
3. ☐ Only 1 or 2 months  
4. ☐ Refuse to answer (995)/do not know (996)/not applicable (997)

4. In the last 12 months, did you ever eat less than you felt you should because there wasn't enough money for food?

1. ☐ Yes **FS4** \_\_\_\_\_  
2. ☐ No  
3. ☐ Refuse to answer (995)/do not know (996)/not applicable (997)

5. In the last 12 months, were you every hungry but didn't eat because there wasn't enough money for food?

1. ☐ Yes **FS5** \_\_\_\_\_  
2. ☐ No  
3. ☐ Refuse to answer (995)/do not know (996)/not applicable (997)

### III. Food Preparation in the Household

1. Which of the following item(s) do you have in your kitchen? Check all that apply.

1. ☐ Refrigerator **FP** \_\_\_\_\_  
2. ☐ Chest Freezer

3. ☐ Stovetop
4. ☐ Pots and pans
5. ☐ Measuring Cups
6. ☐ Knives
7. ☐ Microwave
8. ☐ I do not have any of these items
9. ☐ I do not have access to a kitchen
10. ☐ Refuse to answer (995)/do not know (996)/not applicable (997)

2. Who would you say is the primary shopper for food? That is, who is the one who mainly shops for groceries in the household? **FP2**

- 
1. ☐ Participant
  2. ☐ Mother
  3. ☐ Father
  4. ☐ Grandmother
  5. ☐ Grandfather
  6. ☐ Sister
  7. ☐ Brother
  8. ☐ Other: \_\_\_\_\_
  9. ☐ Refuse to answer (995)/do not know (996)/not applicable (997)

3. Where do you primarily shop for groceries? **FP3** \_\_\_\_\_

1. ☐ Supermarket (e.g., Kroger)
2. ☐ Partial Market (e.g., Walgreens, Dollar Store)
3. ☐ Organic supermarket (e.g., Whole Foods)?
4. ☐ Corner store (e.g., gas station)
5. ☐ Warehouse club store (e.g., Sam's Club or Costco)
6. ☐ Farmer's market
7. ☐ Refuse to answer (995)/do not know (996)/not applicable (997)

4. Which family member is the primary person who prepares (cooks) food?

1. ☐ Participant **FP4** \_\_\_\_\_
2. ☐ Mother
3. ☐ Father
4. ☐ Grandmother
5. ☐ Grandfather
6. ☐ Sister
7. ☐ Brother
8. ☐ Other: \_\_\_\_\_
9. ☐ Refuse to answer (995)/do not know (996)/not applicable (997)

5. What type(s) of cooking is/are done in your household?

1. ☐ Cooking convenience foods/ready-meals **FP5** \_\_\_\_\_
2. ☐ Cooking with ready-made ingredients (like ready-made sauces)
3. ☐ Cooking from basic ingredients

4.  Other:
5.  Refuse to answer (995)/do not know (996)/not applicable (997)

**IV. Dietary Recall**

*Note: remind participant about follow-up survey via phone call. Addresses and phone numbers provided on contact sheet will not be stored or used for analysis.*

1. Could you please list all food and beverage consumed in the past 24 hours to the best of your ability?

Food Description	Time Eaten	Quantity	Description (i.e., recipes, combinations, brand, flavor, low fat, etc.)

Would you be willing to answer participate in a follow-up interview 7 days from now via some phone call? A \$5 gift card will be mailed as an incentive to the address you initially provided for this follow-up survey. Please note that the contact information you provided at the beginning of this survey will be used to contact you, but will be not be used for research purposes.

- a. Yes
- b. No

**V. Fruit and Vegetable Consumption (FV)**

*\*Hand Response Card 1 to survey participant*

1. On average, how many cups of fresh or frozen vegetables do you estimate you consume each day, excluding juice?

\_\_\_\_\_ **FV1**\_\_\_\_\_

\_\_\_\_ Refuse to answer (995)/do not know (996)/not applicable (997)

2. On average, how many cups of canned vegetables do you estimate you consume each day?

\_\_\_\_\_ **FV2**\_\_\_\_\_

\_\_\_\_ Refuse to answer (995)/do not know (996)/not applicable (997)

3. On average, how many cups of peas, corns, or potatoes do you estimate you consume each day?

\_\_\_\_\_ **FV3**\_\_\_\_\_

\_\_\_\_ Refuse to answer (995)/do not know (996)/not applicable (997)

*\*Hand Response Card 2 to survey participant*

4. On average, how many cups of fresh or frozen fruit do you estimate you consume each day, excluding juice?

\_\_\_\_\_ **FV4**\_\_\_\_\_

\_\_\_\_ Refuse to answer (995)/do not know (996)/not applicable (997)

5. On average, how many cups of canned fruit do you estimate you consume each day?

**FV5**\_\_\_\_\_

\_\_\_\_ Refuse to answer (995)/do not know (996)/not applicable (997)

6. How satisfied are you about meeting required dietary recommendations?

1. \_\_\_\_ Very satisfied **FV6**\_\_\_\_\_
2. \_\_\_\_ Satisfied
3. \_\_\_\_ No opinion
4. \_\_\_\_ Dissatisfied
5. \_\_\_\_ Very dissatisfied
6. \_\_\_\_ Refuse to answer (995)/do not know (996)/not applicable (997)

7. What prevents you from getting the recommended daily number of servings of fruits and vegetables (1.5-2 cups of fruit or 2.5-3 cups of vegetable)? *Please choose all that apply*

**FV7**\_\_\_\_\_

1. \_\_\_\_ Nothing—I generally get the recommended daily number of servings
2. \_\_\_\_ Cost—fruits and vegetables are too expensive compared to other foods
3. \_\_\_\_ Transportation—it is too difficult to reach grocery or transport purchased items
4. \_\_\_\_ Time—it takes too long to prepare fruits and vegetables
5. \_\_\_\_ Knowledge—am not sure how to measure and prepare these foods
6. \_\_\_\_ Equipment and storage
7. \_\_\_\_ Refuse to answer (995)/do not know (996)/not applicable (997)

## **VI. Health Conditions (HC)**

1. In the past year, have you seen a doctor or health professional?

1. \_\_\_\_ Yes **HC1**\_\_\_\_\_
2. \_\_\_\_ No
3. \_\_\_\_ Refuse to answer (995)/do not know (996)/not applicable (997)

2. Has a doctor or health professional informed you that you have any of the following?

1. \_\_\_\_ High blood pressure **HC2**\_\_\_\_\_
2. \_\_\_\_ High cholesterol
3. \_\_\_\_ Pre-diabetes
4. \_\_\_\_ Type II diabetes
5. \_\_\_\_ Cancer
6. \_\_\_\_ Refuse to answer (995)/do not know (996)/not applicable (997)

3. For which of the following health conditions are you prescribed medication? Mark all that apply.

1. \_\_\_\_ High blood pressure **HC3**\_\_\_\_\_



2. ☐ High cholesterol
3. ☐ Pre-diabetes
4. ☐ Type II diabetes
5. ☐ Cancer
6. ☐ Refuse to answer (995)/do not know (996)/not applicable (997)

a. Are you currently taking the prescribed medication for the following conditions?

1. ☐ High blood pressure **HC3a** \_\_\_\_\_
2. ☐ High cholesterol
3. ☐ Pre-diabetes
4. ☐ Type II diabetes
5. ☐ Cancer
6. ☐ Refuse to answer (995)/do not know (996)/not applicable (997)

Would you please share with me your height and weight (estimated):

4. Height: \_\_\_\_\_ **HC4** \_\_\_\_\_

5. Weight: \_\_\_\_\_ **HC5** \_\_\_\_\_  
☐ Refuse to answer (995)/do not know (996)/not applicable (997)

6. In the past 12 months, have you or someone in your households had to choose between buying food and paying for medicine or medical care?

1. ☐ Yes **HC6** \_\_\_\_\_
2. ☐ No
3. ☐ Refuse to answer (995)/do not know (996)/not applicable (997)

## **VII. Neighborhood Services, Inc. (NS)**

1. Are you a registered Neighborhood Services, Inc. client? **NS1** \_\_\_\_\_  

1. ☐ Yes
2. ☐ No
3. ☐ Refuse to answer (995)/do not know (996)/not applicable (997)

2. When was your last visit to NSI? **NS2** \_\_\_\_\_  

1. ☐ First visit
2. ☐ Last month
3. ☐ 2 months ago
4. ☐ In the last six months
5. ☐ Refuse to answer (995)/do not know (996)/not applicable (997)

3. Which item(s) would you say you shop for most for your household when visiting NSI?

- NS3** \_\_\_\_\_
1. ☐ Fresh vegetable
  2. ☐ Fresh fruit

3. ☐ Pasta
4. ☐ Rice
5. ☐ Beans
6. ☐ Canned vegetables
7. ☐ Canned fruit
8. ☐ Bread
9. ☐ Tomato Sauce
10. ☐ Tomato Soup
11. ☐ Vegetable Soup
12. ☐ Beef Soup
13. ☐ Chicken Soup
14. ☐ Peanut Butter
15. ☐ Cereal
16. ☐ Crackers
17. ☐ Chips
18. ☐ Miscellaneous Items
19. ☐ Desserts/Sweets
20. ☐ Meat
21. ☐ Personal Items

When shopping for your household, which food items are most important to you to shop for at NSI?

*\*Hand Response Card 3 to participant*

Food Item	Least important (1)	Not that important (2)	Neutral (3)	Important (4)	Very important (5)	Refused to Answer (995) Do not know (996) Did not Ask/not applicable (997)	
NS4 Fresh Vegetable							NS4__
NS5 Fresh Fruit							NS5__
NS6 Pasta							NS6__
NS7 Rice							NS7__
NS8 Beans							NS8__
NS9 Canned vegetable							NS9__
NS10 Canned Fruit							NS10__
NS11 Bread							NS11__
NS12 Tomato sauce							NS12__
NS13 Tomato Soup							NS13__
NS14Vegetable Soup							NS14__
NS15Beef Soup							NS15__
NS16Chicken soup							NS16__
NS17Peanut Butter							NS17__
NS18Crackers							NS18__
NS19 Cereal							NS19__
NS20 Chips							NS20__
NS21 Meat							NS21__
NS22 Miscellaneous Items							NS22__
NS23 Dessert/sweets							NS23__
NS24 Personal Items							NS24__

# **VIII. Food Sources (FSo)**

1. In the past 12 months, how often have you or someone in your household used any of the following food sources?

*\*Hand Response Card 4 to participant*

	<b>Never (1)</b>	<b>1-3 time a year (2)</b>	<b>4-6 times a year (3)</b>	<b>1 or more times each month (4)</b>	<b>Refused to Answer (995) Do not know (996) Did not Ask/not applicable (997) (997)</b>	
<b>FSo1 Food pantry</b>						<b>FSo1</b> __
<b>FSo2 Free Meal (e.g., Salvation Army, Community Center)</b>						<b>FSo2</b> __
<b>FSo3 Federal School Lunch or Breakfast Program</b>						<b>FSo3</b> __
<b>FSo4 Farmers' Market or Produce Stand</b>						<b>FSo4</b> __
<b>FSo5 Friends, Co- Workers, Neighbors</b>						<b>FSo5</b> __
<b>FSo6 Relatives Outside of Home</b>						<b>FSo6</b> __
<b>FSo7 Community Garden or Personal Garden</b>						<b>FSo7</b> __
<b>FSo8 Dumpster Diving</b>						<b>FSo8</b> __

## Appendix B

### **Dietary Recall Follow-up Phone Interview Verbal Script**

#### **Screening Questions**

If so, we shall begin:

1. If you recall, I gave each respondent a card with the time and date I would call and a unique code number. Do you still have this card with you at the moment?
  - a. Yes
  - b. No

*\*If No to #1, make a note on the survey, but continue with questioning*

*\*If Yes to #1:*

Would you please tell me the participant ID number? This is another way for us to confirm your identity before we ask any further questions.

Participant ID: \_\_\_\_\_

*Note: Detach screening questions before beginning surveying process. This will not be used for research purposes.*

## Interview Questions

*Note: There may be the possibility of asking clarifying questions in order to gather information from respondent.*

“Thank you. I will now ask you a series of questions about your diet, meal preparation, and food patterns in the past 7 days. To the best of your ability, please provide as much detail as possible when answering any questions.

1. In the past 7 days, please describe the meals or foods you ate or prepared for you and your household?
2. Have you made any meals with the food received from Neighborhood Services, Inc.?
  - a. Yes
  - b. No
3. Please describe the meals made from food received from Neighborhood Services, Inc.
4. Is there any food from Neighborhood Services, Inc. that is leftover (not consumed yet)?
  - a. Yes
  - b. No
5. If yes, which foods have not been consumed?
6. Have you or any household member consumed fruit from NSI? Fruits can include canned, frozen, and fresh fruit. If so, please describe the foods consumed.
  - a. Yes

Description:

b. No

7. Have you or any household member consumed vegetables from NSI? Vegetables can include canned, frozen, and fresh vegetables. If so, please describe the foods consumed.

a. Yes

Description:

b. No

8. Have you or any household members consumed any grains from NSI? Grains include bread, pasta, popcorn, and oatmeal. If so, please describe the foods consumed.

a. Yes

Description:

b. No

9. Have you or any household members consumed any proteins from NSI? Proteins include meat, seafood, poultry (chicken), eggs, or nuts and seeds. If so, please describe the foods consumed.

a. Yes

Description:

b. No

10. Have you or any household members consumed any dairy from NSI? Dairy food items milk, yogurt, and cheese. If so, please describe the foods consumed.

a. Yes

Description:

b. No

11. In the past 7 days, have you purchased any foods from other sources (e.g. convenience/corner store, dollar store, drug store, fast food)? If so, which foods have been purchased?

a. Yes

Description:

b. No

That completes the phone-call interview for this study. Thank you for your time and the information you provided.

Thank you for your time and have a good day.



## Appendix C

Date: \_\_\_\_\_  
Time: \_\_\_\_\_

Neighborhood Services, Inc. (NSI) Infrastructure  
Please describe your role with NSI.

### I. Food Items (FI)

A. I will read a list of food categories. In your opinion, which food options are chosen the most by clients at Neighborhood Services, Inc.?

- |                            |                   |
|----------------------------|-------------------|
| 1. ___ Fresh Fruit         | <b>FI1</b> _____  |
| 2. ___ Fresh Vegetables    | <b>FI2</b> _____  |
| 3. ___ Canned vegetables   | <b>FI3</b> _____  |
| 4. ___ Canned Fruit        | <b>FI4</b> _____  |
| 5. ___ Bread               | <b>FI5</b> _____  |
| a. ___ White Bread         | <b>FI5a</b> _____ |
| b. ___ Whole Wheat         | <b>FI5b</b> _____ |
| c. ___ Whole Grain         | <b>FI5c</b> _____ |
| d. ___ Rolls               | <b>FI5d</b> _____ |
| e. ___ Pizza Dough/crust   | <b>FI5e</b> _____ |
| 6. ___ Peanut Butter       | <b>FI6</b> _____  |
| 7. ___ Canned soup         | <b>FI7</b> _____  |
| a. ___ Non-vegetarian soup | <b>FI7a</b> _____ |
| b. ___ Vegetarian Soup     | <b>FI7b</b> _____ |
| 8. ___ Grains              | <b>FI8</b> _____  |
| a. ___ Pasta               | <b>FI8a</b> _____ |
| b. ___ Rice                | <b>FI8b</b> _____ |
| c. ___ Produce             | <b>FI8c</b> _____ |

1. Where do you receive fresh produce from?

2. How often do you receive fresh produce each month?

3. What types of fresh produce do you receive?

4. On average, how many families do you serve each month?
5. In your opinion, what is your perception of the overall health of Neighborhood Services, Inc. clients?
6. How do you feel about how the infrastructure of the pantry serves the clients?